Indicator: Infant Mortality (090)

Infant mortality is a particularly useful measure of health status because it indicates both current health status of the population and predicts the health of the next generation (NCHS, 2001). Infant mortality in the United States is defined as the death of a child before the age of 1 year.

This indicator presents infant mortality for the U.S. based on mortality data from the National Vital Statistics System (NVSS). The NVSS registers virtually all deaths and births nationwide with data coverage from 1933 to present and from all 50 States and the District of Columbia.

What the Data Show

In 2001 and 2002, a total of 27,568 and 28,034 deaths, respectively, occurred in infants under 1 year of age. As reported in ROE03, the infant mortality rate in 1999 was 7.1 per 1,000 live births, the lowest ever recorded in the U.S. (Hoyert, et al., 2001). This trend continued in 2001 with an infant mortality rate of 6.8 per 1,000 live births. However, data for 2002 suggest a slight increase in the infant mortality rate, reported as 7.0 per 1,000 live births (NCHS, 2004). Figure 090-1 presents the national trends in infant mortality between 1940 and 2000. A striking decline has occurred during this time period with overall infant mortality rates dropping from nearly 50 deaths per 1,000 live births in 1940 to just under seven deaths per 1,000 live births in 2000. Males generally had higher rates than females, although this gap has been decreasing over time.

The infant mortality rate for African Americans decreased from 14.6 per 1,000 live births in 1999 (Hoyert, et al., 2001) to 14.4 per 1,000 live births in 2002 (NCHS, 2004). However, this is still twice the rate compared to White infants, which ranged from 5.7-5.8 per 1,000 live births between 1999 and 2002. Reported mortality rates for Hispanic infants are 5.8 and 5.5 per 1,000 live births in 1999 and 2001, respectively (Hoyert, et al., 2001; Anderson and Smith, 2003).

In the U.S. in 2002, the 10 leading causes of infant mortality accounted for about 68% of all infant deaths with the subgroup consisting of congenital malformations, deformations, and chromosomal abnormalities having the highest rate at 1.40 per 1,000 live births (Figure 090-2). This category alone accounts for approximately 20% of all infant deaths in 2002.

Indicator Limitations

- Ranking causes of deaths is a somewhat arbitrary procedure. Rankings only represent the causes of death that occur more frequently among eligible causes to be ranked. Thus, rankings of cause-specific mortality could change depending on the defined list of causes that are considered (Anderson and Smith, 2003).

Data Sources

Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control. WISQARS Leading Causes of Death Reports, 1999–2001. http://webapp.cdc.gov/sasweb/ncipc/leadcaus.html.

CDC. WONDER Compressed Mortality 1999–2001 with ICD-10 Codes. http://wonder.cdc.gov/mortICD10J.html.

National Center for Health Statistics (NCHS). 2004. Deaths Final Data 2002. National Vital Statistics Volume 53(5). October 12, 2004: http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_05.pdf. See Table E.

Anderson and Smith. 2003. National Vital Statistics Report (NVSR). Deaths: Leading Causes for 2001. Volume 52(9). November 7, 2003. http://www.cdc.gov/nchs/data/nvsr/nvsr52/nvsr52_09.pdf. (Alternate source).
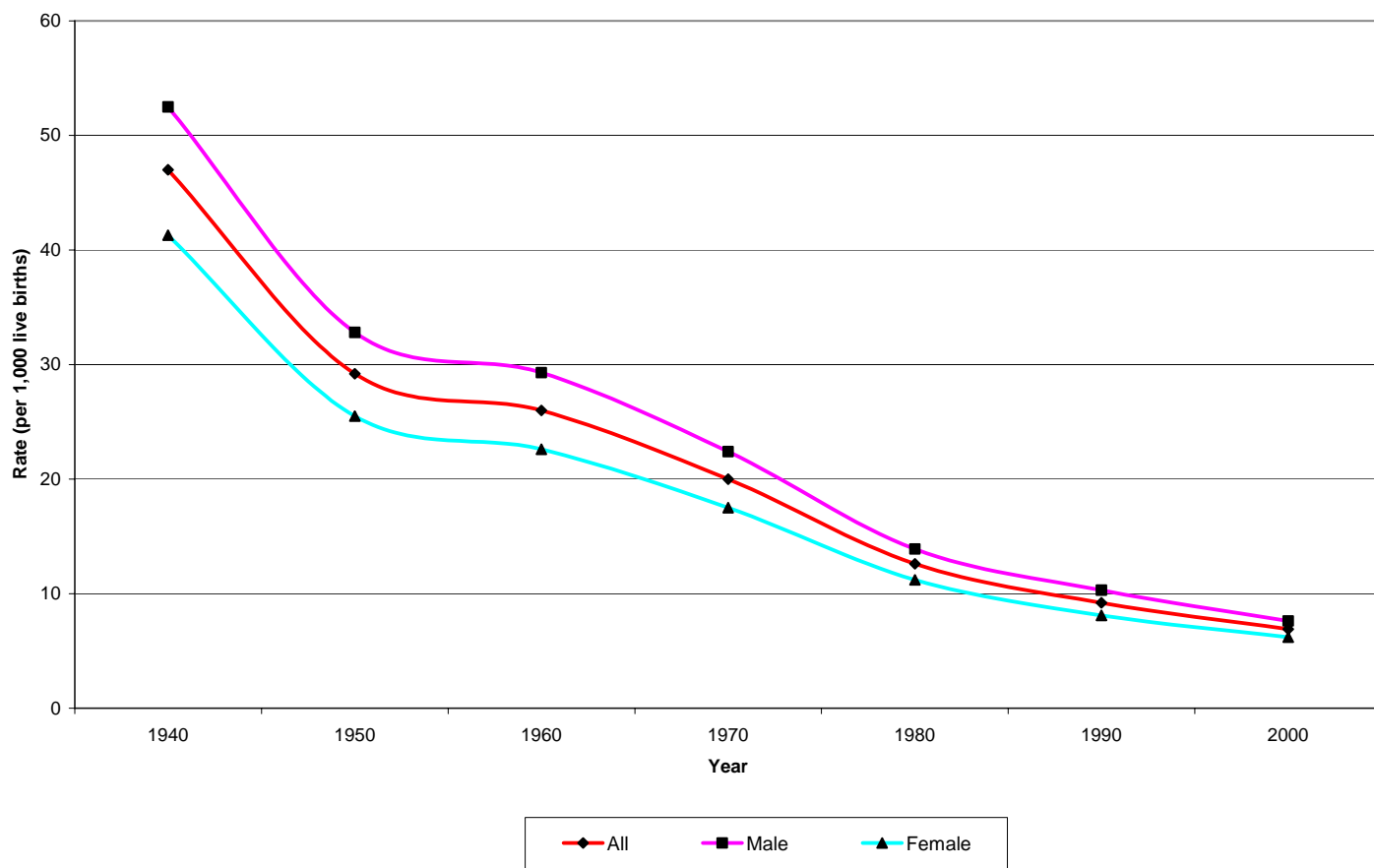
References

Anderson and Smith. 2003. National Vital Statistics Report (NVSR). Deaths: Leading Causes for 2001. Volume 52, Number 9. November 7, 2003. http://www.cdc.gov/nchs/data/nvsr/nvsr52/nvsr52_09.pdf.

Hoyert DL, Arias E, Smith BL, Murphy SL, Kochanek KD. Deaths: Final Data for 1999. 2001. National Vital Statistics Report (NVSR), Volume 49:6-9.

National Center for Health Statistics (NCHS). 2004. Deaths Final Data 2002. National Vital Statistics Volume 53 (5): http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_05.pdf. See Table E.
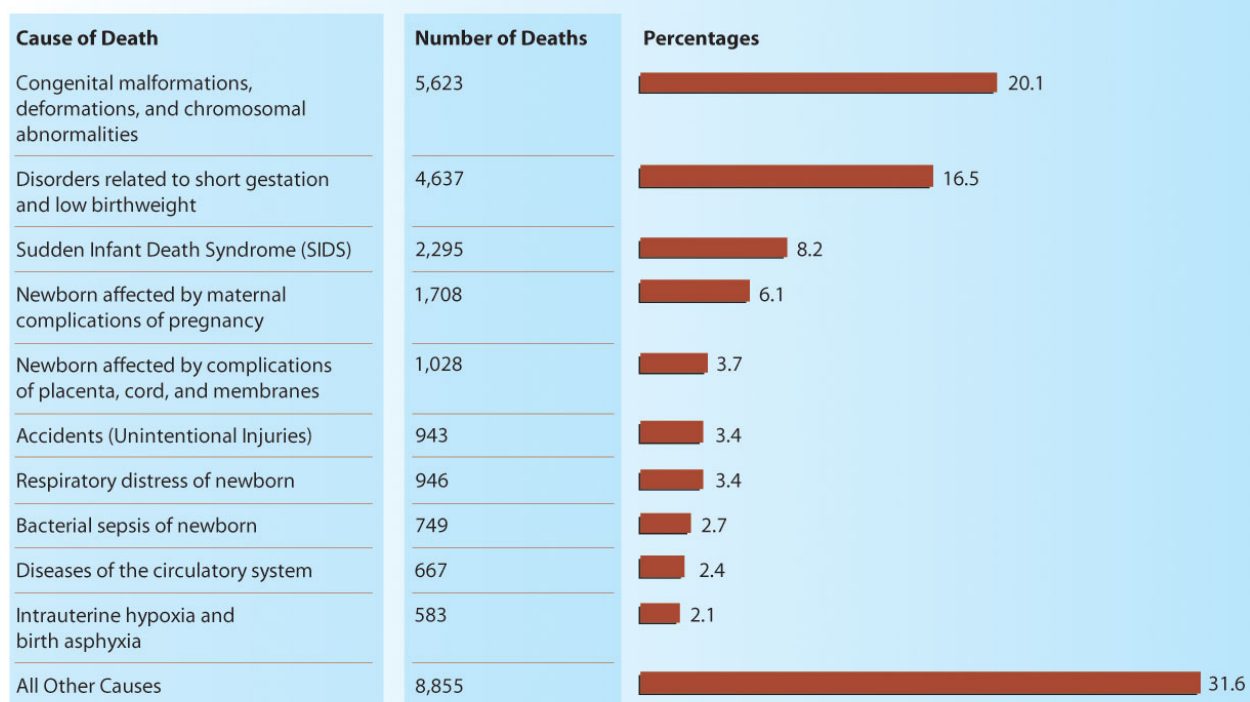
Graphics

Figure 090-1: National Trends in Infant Mortality Rates Between 1940 and 2000

Figure 090-2. Leading Causes of Infant Death, 2002

Cause of Death	Number of Deaths	Percentages
Congenital malformations, deformations, and chromosomal abnormalities	5,623	20.1
Disorders related to short gestation and low birthweight	4,637	16.5
Sudden Infant Death Syndrome (SIDS)	2,295	8.2
Newborn affected by maternal complications of pregnancy	1,708	6.1
Newborn affected by complications of placenta, cord, and membranes	1,028	3.7
Accidents (Unintentional Injuries)	943	3.4
Respiratory distress of newborn	946	3.4
Bacterial sepsis of newborn	749	2.7
Diseases of the circulatory system	667	2.4
Intrauterine hypoxia and birth asphyxia	583	2.1
All Other Causes	8,855	31.6

Source: National Center For Health Statistics (NCHS). 2004. Deaths Final Data 2002. National Vital Statistics Vol. 53 No. 5. http://www.cdc.gov/nchs/data/nvsr53/nvsr53_05.pdf. See Table E.

R.O.E. Indicator QA/QC

Data Set Name: INFANT MORTALITY
Indicator Number: 090 (89106)
Data Set Source: CDC, NCHS
Data Collection Date: ongoing
Data Collection Frequency: yearly
Data Set Description: Infant Mortality
Primary ROE Question: What are the trends in health status in the U.S.?

Question/Response

T1Q1 Are the physical, chemical, or biological measurements upon which this indicator is based widely accepted as scientifically and technically valid?

Yes. The National Vital Statistics System (NVSS) is the oldest and most successful example of inter-governmental data sharing in Public Health and the shared relationships, standards, and procedures form the mechanism by which NCHS collects and disseminates the Nation's official vital statistics. The methodology for collecting vital statistics is standardized and outlined in Model State Vital Statistics Act and Regulations Revised April 1995, DHHS publication (PHS) 95-1115 (http://www.cdc.gov/nchs/data/misc/mvsact92aacc.pdf)

T1Q2 Is the sampling design and/or monitoring plan used to collect the data over time and space based on sound scientific principles?

Yes. The National Vital Statistics System is responsible for the Nation s official vital statistics. These vital statistics are provided through State-operated registration systems. Standard forms for the collection of data and model procedures for the uniform registration of the events are developed and recommended for State use through cooperative activities of the States and the NCHS (http://www.cdc.gov/nchs/data/dvs/DEATH11-03final-ACC.pdf). U.S. Standard Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician, medical examiner, or coroner provides medical certification of cause of death.

T1Q3 Is the conceptual model used to transform these measurements into an indicator widely accepted as a scientifically sound representation of the phenomenon it indicates?

Yes. The data collected by NVSS are routinely referenced and used in epidemiological studies.

T2Q1 To what extent is the indicator sampling design and monitoring plan appropriate for answering the relevant question in the ROE?

Virtually all deaths are registered with the NVSS nationwide. The temporal coverage of the data is from 1933 to present. Data are collected from all 50 States including the District of Columbia.

T2Q2 To what extent does the sampling design represent sensitive populations or ecosystems?

The data set has nationwide death reporting, including sensitive populations.

T2Q3 Are there established reference points, thresholds or ranges of values for this indicator that unambiguously reflect the state of the environment?

Not applicable

T3Q1 What documentation clearly and completely describes the underlying sampling and analytical procedures used?

The sampling and quality assurance information can be found in Model State Vital Statistics Act and Regulations Revised April 1995, DHHS publication (PHS) 95-1115 (http://www.cdc.gov/nchs/data/misc/mvsact92aacc.pdf). Documentation is also available at http://wonder.cdc.gov/wonder/help/mort.html Table HH1 data sources: Sources: Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control. WISQARS Leading Causes of Death Reports, 1999 2001. http://webapp.cdc.gov/sasweb/ncipc/leadcaus.html. CDC. WONDER Compressed Mortality 1999 2001 with ICD-10 Codes. http://wonder.cdc.gov/mortICD10J.html. Alternate Source: Anderson and Smith. 2003. National Vital Statistics Report (NVSR). Deaths: Leading Causes for 2001. Volume 52, Number 9. November 7, 2003. http://www.cdc.gov/nchs/data/nvsr/nvsr52/nvsr52_09.pdf National Center for Health Statistics (NCHS). 2004. Deaths Final Data 2002. National Vital Statistics vol 53 no. 5 http://www.cdc.gov/nchs/data/nvsr/nvsr53/nvsr53_05.pdf see Table C and E

T3Q2 Is the complete data set accessible, including metadata, data-dictionaries and embedded definitions or are there confidentiality issues that may limit accessibility to the complete data set?

The data can be accessed up to the county level through the electronic data warehouse for CDC at http://wonder.cdc.gov. Individual level data are not available due to confidentiality issues.

T3Q3 Are the descriptions of the study or survey design clear, complete and sufficient to enable the study or survey to be reproduced?

Yes. Virtually all deaths from the 50 states, including District of Columbia, submit mortality data to the NVSS at NCHS. The recommended certificate of death is posted at http://www.cdc.gov/nchs/data/dvs/DEATH11-03final-ACC.pdf. The documentation for the mortality data set is http://wonder.cdc.gov/wonder/help/mort.html.

T3Q4 To what extent are the procedures for quality assurance and quality control of the data documented and accessible?

See answer to T3Q1

T4Q1 Have appropriate statistical methods been used to generalize or portray data beyond the time or spatial locations where measurements were made (e.g., statistical survey inference, no generalization is possible)?

Not applicable

T4Q2 Are uncertainty measurements or estimates available for the indicator and/or the underlying data set?

Not applicable

T4Q3 Do the uncertainty and variability impact the conclusions that can be inferred from the data and the utility of the indicator?

Not applicable

T4Q4 Are there limitations, or gaps in the data that may mislead a user about fundamental trends in the indicator over space or time period for which data are available?

The mortality data on the Compressed Mortality File at http://wonder.cdc.gov/mortSQL.html are based on records for all deaths occurring in the fifty states and the District of Columbia. Deaths to foreign residents are excluded. Deaths to residents who died abroad are not included on this file. The following was noted by Anderson and Smith (2003): Ranking causes of death is to some extent an arbitrary procedure. The rank order of any particular cause of death will depend on the list of causes from which selection is made and on the rules applied in making the selection. Different cause lists and different ranking rules will typically produce different leading causes of death. The International Classification of Diseases 9th Revision (ICD 9) codes are used to specify underlying cause of death for years 1979 - 1998. Beginning in 1999, cause of death is specified with the International Classification of Diseases 10th Revision (ICD 10) codes. The two revisions differ substantially, and to prevent confusion about the significance of any specific disease code, data queries are separate.